Abstract

Watermark and pattern detection can be improved by compensating for artifacts introduced into an image by a printer and/or scanner through which the image has passed. With the present invention, prior to watermark or pattern detection, the image is filtered or modified to compensate for artifacts introduced by the printer and/or scanner. Some scanners automatically compensate for artifacts introduced by the scanner by using a calibrated tone map. The automatic compensation provides an image from which, a watermark can be easily read. However, generally the user is provided with an interface which can be used to change certain parameters such contrast and intensity. The changes made by the user change the compensation (i.e. the tone map) applied to the image. If the user changes the compensation applied to the image it can affect the ability to read the watermark. The present invention provides a system which reverses any compensation introduced by the user so that the watermark or pattern can be more easily read. In another embodiment the invention takes into consideration that some printers and scanners have transfer functions which differ in the "x" and "y" directions. Thus the compensation introduced by the filter can differ in the "x" and "y" directions. In one embodiment, a scanner introduces aliasing frequencies into an image. Detection is improved by selectively removing certain frequencies. In another embodiment, the filter compensates for fact that the scanner frequency response falls off at higher frequencies.